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PROBLEMS FOR SOLUTION.

ARITHMETIC.

126. Proposed by G. B. M. ZERR, A.M., Ph.D., Professor of Mathematics and Science, Chester High School, Chester, Pa.

Bought 150 head of stock for \$300, paying for each kind $\$2\frac{5}{8}$, $\$1\frac{1}{2}$, and $\$7\frac{5}{7}$, respectively. Find number of each kind bought.

127. Proposed by P. S. BERG, A. M., Principal of Schools, Larimore, N. D.

A man borrows \$1000 of a Building and Loan Association, and at the same time subscribes for 10 \$100-shares of stock. A membership fee of \$1 per share is charged. At the beginning of each month an installment of \$1 per share is paid, also 5% interest and 5% premium on the \$1000. The stock matures in 75 months and the debt is cancelled. What rate of interest does he pay per annum?

*** Solutions of these problems should be sent to B. F. Finkel not later than April 10.

GEOMETRY.

138. Proposed by JOHN M. HOWIE, Professor of Mathematics, The Nebraska State Normal, Peru, Neb.

K is the middle point of any chord AB of a given circle. CD and EF are any two chords passing through K . CF and ED intersect AB at M and N , respectively. Prove that KM equals KN .

139. Proposed by B. F. FINKEL, A. M., M. Sc., Professor of Mathematics and Physics in Drury College, Springfield, Mo.

If $x^2 + y^2 = 1$ [x and y being points corresponding to complex numbers], prove that x and y are at the ends of conjugate radii of an ellipse whose foci are ± 1 . [From *Harkness and Morley's Introduction to the Theory of Functions*.]

140. Proposed by J. OWEN MAHONEY, B. E., M. Sc., Professor of Mathematics, Central High School, Dallas, Tex.

Having given two points on a range and a point that bisects the distance between two other points that form an harmonic ratio with the given points, give, if possible, a geometrical construction for locating the other two points.

*** Solutions of these problems should be sent to B. F. Finkel not later than April 10.

MECHANICS.

103. Proposed by G. B. M. ZERR, A.M., Ph.D., Professor of Mathematics and Science, Chester High School, Chester, Pa.

Given the lengths a , b of the sides of a parallelogram, the direction of side a , and the position of the centroid. Prove that the locus of the foci of the ellipse of gyration at the centroid is a Cassinian Oval, having its foci distant $a/2\sqrt{3}$ from the centroid, and the constant product of its focal distances equal to $\frac{1}{2}b^2$.

104. Proposed by F. P. MATZ, M. Sc., Ph. D., Professor of Mathematics and Astronomy in Irving College, Mechanicsburg, Pa.

From a locomotive and tender standing still on a bridge, the pressure on the bridge is $p_1 = 80$ tons. The track is supposed to be straight and practically